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Agency

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National Priority Chemicals Trends Report (2000-2004)

Section 4 Chemical Specific Trends Analyses for Priority Chemicals (2000–2004): Pendimethalin

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Pendimethalin

Chemical Information:

Pendimethalin is an orange–yellow crystalline solid and is formulated in liquid, solid, and granular forms, and also as an emulsifiable concentrate.

CAS Number – 40487–42–1

Alternate Names – 3, 4–xylidine, benzenamine, penoxalin

General Uses – Pendimethalin is used as a pre–emergence and postemergence herbicide on cotton, dry onions, dry bulb shallots, edible beans, corn, legumes, garlic, grain, nonbearing fruit, nut crops, peanuts, potatoes, rice, soybeans, sugar cane, sunflowers, sweet corn, and sweet lupine. It is also used for pre–emergence control of many annual grasses and certain broadleaf weeds. Pendimethalin is applied by broadcasting, directed spray, and soil treatment.

Potential Hazards – This chemical is considered to have low acute toxicity and was added to the TRI based on liver toxicity. It is slightly toxic via exposure to it by eating or drinking contaminated food or water.

Summary Analysis:

- **NATIONAL:** In 2004, seven facilities reported approximately 476,000 pounds of pendimethalin. Compared to the quantity of pendimethalin reported in 2000, there was a 29 percent decrease in 2004. The quantity of pendimethalin increased each year since 2001.
- **REGIONAL/STATE:** In 2004, facilities in Regions 4 and 7 reported approximately 94 percent of the pendimethalin. Facilities in only four states (Florida, Missouri, Iowa, and Ohio) reported pendimethalin; facilities in Missouri and Florida reported 94 percent of the total quantity.
- **FACILITIES:** Of the seven facilities that reported pendimethalin in 2004, one facility accounted for approximately 55 percent of the total quantity of this chemical.
- **MANAGEMENT:** Since 2000, facilities have used treatment and land disposal to manage 56 percent and 44 percent, respectively, of the pendimethalin.
- **INDUSTRY SECTOR:** In 2004, facilities in three industry sectors (SIC 2879 – Pesticides and agricultural chemicals, nec, SIC 2061– Raw cane sugar, and SIC 2875 – Fertilizers, mixing only) reported pendimethalin. Compared to the quantities of pendimethalin reported in 2000, facilities in SIC 2879 reported a decrease of approximately 379,000 pounds.

National Trends:

Exhibit 4.202 shows the number of facilities that reported pendimethalin in 2000 to 2004 and the quantities that were managed via disposal, treatment, energy recovery, and recycling. In 2004, seven facilities reported approximately 476,000 pounds of pendimethalin. Compared to the quantity of pendimethalin reported in 2000, there was a 29 percent decrease in 2004. The quantity of pendimethalin increased each year since 2001.

Since 2000, facilities have used treatment and land disposal to manage 56 percent and 44 percent, respectively, of the pendimethalin. The quantity disposed of has increased each year since 2000, with significant increases in 2003 and in 2004. No energy recovery for pendimethalin was reported from 2000 to 2004. Aside from over 41,000 pounds of pendimethalin recycled in 2002, no more than 6,000 pounds of pendimethalin were recycled in other years since 2000.

Exhibit 4.202. National Management Methods for Pendimethalin, 2000–2004

Management Methods of Pendimethalin and Number of Facilities	2000	2001	2002	2003	2004	Percent Change (2000–2004)	Management Method -- Percent of Quantity of This PC (2004)
Number of Facilities	8	12	11	8	7	–12.5%	-
Disposal Quantity (pounds)	24,529	70,570	72,404	139,764	210,222	757.0%	44.2%
Energy Recovery Quantity (pounds)	0	0	0	0	0	NA	0.0%
Treatment Quantity (pounds)	649,602	129,625	349,423	289,787	265,473	–59.1%	55.8%
Priority Chemical Quantity (pounds)	674,131	200,195	421,827	429,551	475,695	–29.4%	-
Recycling Quantity (pounds)*	2,000	6,000	41,401	4,360	2,875	43.7%	-
*Note: Waste minimization is the emphasis of this Report. As such, we primarily focus on quantities of PCs that are managed via onsite/offsite disposal, treatment, or energy recovery because we believe these PC quantities offer the greatest opportunities for waste minimization. Because recycled quantities of PCs are already directed to their best uses, they are considered separate and distinct from the quantities of PCs not recycled. Throughout this section, the recycled quantity is presented to provide some perspective regarding the quantity of this PC already recycled compared to the quantities that are managed via disposal, treatment, and energy recovery and thus potentially available for waste minimization.							

Exhibit 4.203 shows the number of facilities that reported pendimethalin within various quantity ranges. Of the seven facilities that reported pendimethalin in 2004, one facility accounted for approximately 55 percent of the total quantity of this chemical. Five of the seven facilities reported approximately 99 percent of the total quantity of pendimethalin in 2004.

Exhibit 4.203. Distribution of Quantities by Facilities Reporting Pendimethalin, 2004

Pendimethalin (475,695 pounds)		
Quantity Reported	Number of Facilities Reporting This Quantity (2004)	Percent of Total Quantity of This PC (2004)
up to 10 pounds	0	0.0%
11 – 100 pounds	0	0.0%
101 – 1,000 pounds	0	0.0%
1,001 – 10,000 pounds	2	1.1%
10,001 – 100,000 pounds	4	44.2%
100,001 – 1 million pounds	1	54.7%
> 1 million pounds	0	0.0%

EPA Regional Trends:

Exhibits 4.204 and 4.205 show the quantity of pendimethalin reported by facilities in five EPA regions in 2000 to 2004. In 2004, facilities in Regions 4 and 7 reported approximately 94 percent of the pendimethalin. The quantity of pendimethalin reported by Region 4 facilities increased significantly, compared to the quantities reported in 2000 as well as in 2003, by 167,000 pounds and 68,000 pounds, respectively. Since 2000, facilities in Region 7 reported a decrease of approximately 373,000 pounds.

Exhibit 4.204. Regional Quantity of Pendimethalin, 2000–2004

EPA Region	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Percent Change in Quantity (2000–2004)	Percent of Total Quantity of This PC (2004)
2	6,316	346	665	0	0	–100.0%	0.0%
4	20,342	69,555	68,909	119,470	187,711	822.8%	39.5%
5	13,082	7,984	11,246	25,505	26,549	102.9%	5.6%
7	634,391	122,181	341,007	284,576	261,435	–58.8%	55.0%
9	0	129	0	0	0	NA	0.0%
Total	674,131	200,195	421,827	429,551	475,695	–29.4%	100.0%

Exhibit 4.205. Distribution of Facilities Reporting Pendimethalin in 2004 and the Quantities of Pendimethalin Reported in 2004, by Region

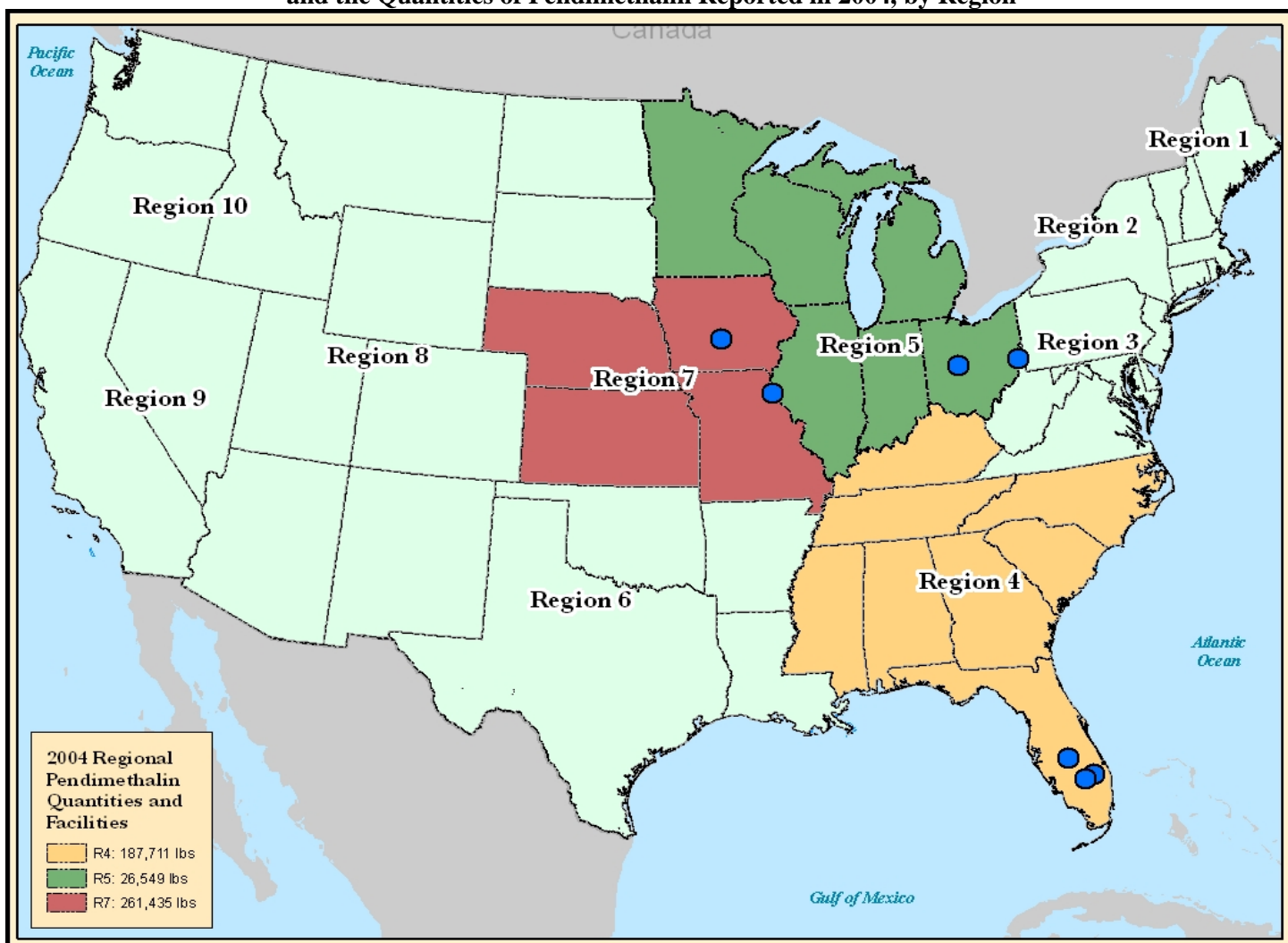


Exhibit 4.206 shows how facilities managed pendimethalin in the three EPA regions in 2004. Facilities in Regions 4 and 5 land disposed most of the pendimethalin. Region 7 facilities treated virtually 100 percent of the pendimethalin. In 2004, one facility in each of Regions 4 and four reported some recycling of pendimethalin.

Exhibit 4.206. Regional Management Methods for Pendimethalin, 2004

EPA Region	Quantity of Pendimethalin (2004)	Percent of Pendimethalin (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
			Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
4	187,711	39.5%	158,889	28,822	0	0	0	0	451	0
5	26,549	5.6%	0	22,510	0	0	0	4,039	2,424	0
7	261,435	55.0%	1	0	0	0	250,000	11,434	0	0
Total	475,695	100.0%	158,890	51,332	0	0	250,000	15,473	2,875	0

Exhibit 4.207. State Quantity Trends for Pendimethalin, 2000–2004

State	Total Quantity (pounds) of Pendimethalin					Change in Quantity (2000–2004)	Percent Change in Quantity (2000–2004)	Percent of Total Quantity of This PC (2004)
	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)			
MO	630,401	111,401	339,641	280,131	260,235	–370,166	–58.7%	54.7%
FL	20,342	61,613	57,219	119,470	187,711	167,369	822.8%	39.5%
OH	13,082	7,984	11,246	25,505	26,549	13,467	102.9%	5.6%
IA	3,990	10,780	1,350	4,445	1,200	–2,790	–69.9%	0.3%
GA	0	7,524	11,050	0	0	0	NA	0.0%
NJ	6,316	346	665	0	0	–6,316	–100.0%	0.0%
AL	0	418	640	0	0	0	NA	0.0%
NE	0	0	16	0	0	0	NA	0.0%
CA	0	129	0	0	0	0	NA	0.0%
Total	674,131	200,195	421,827	429,551	475,695	–198,436	–29.4%	100.0%

Exhibits 4.208, 4.209, and 4.210 show the trends for the quantities of pendimethalin in the top states in which facilities reported this PC in 2004.

Exhibit 4.208. Iowa and Missouri Trends for Pendimethalin, 2000–2004

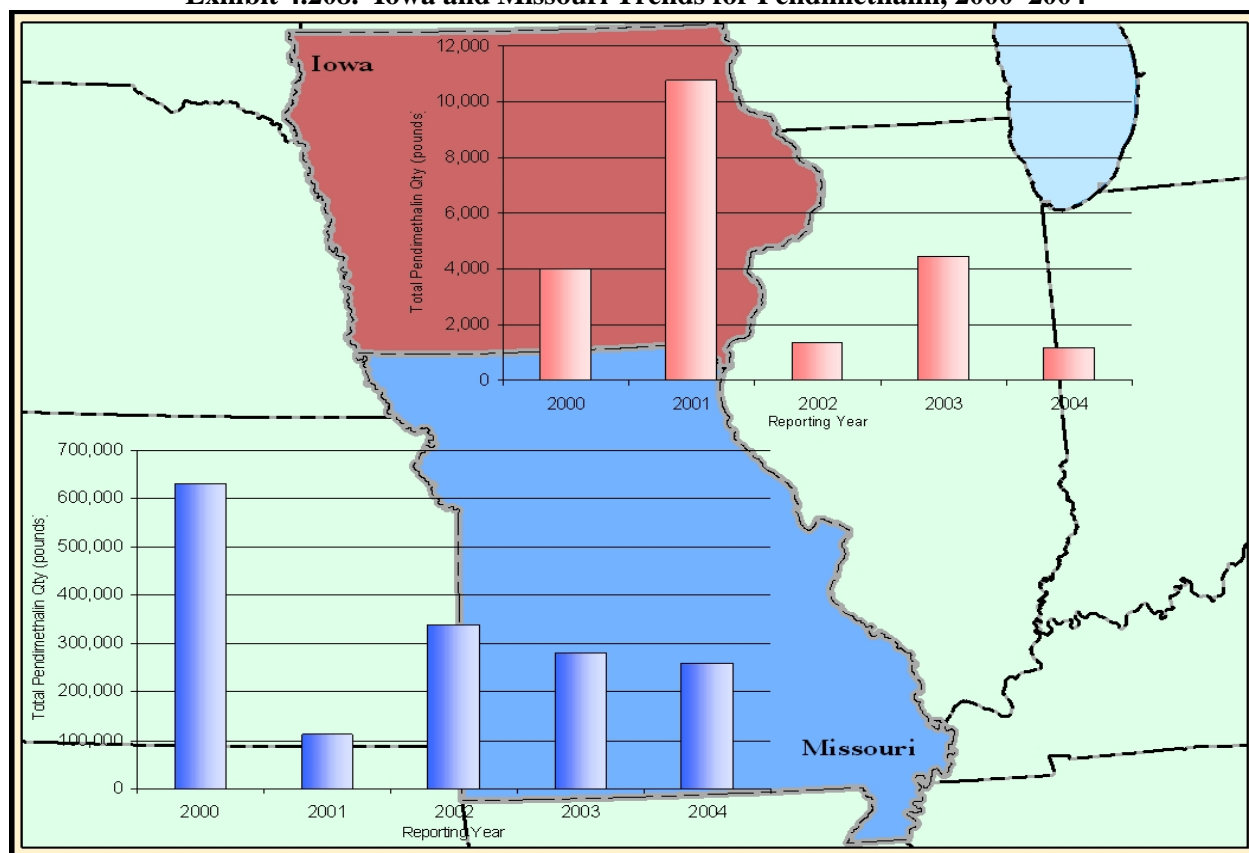


Exhibit 4.209. Georgia and Florida Trends for Pendimethalin, 2000–2004

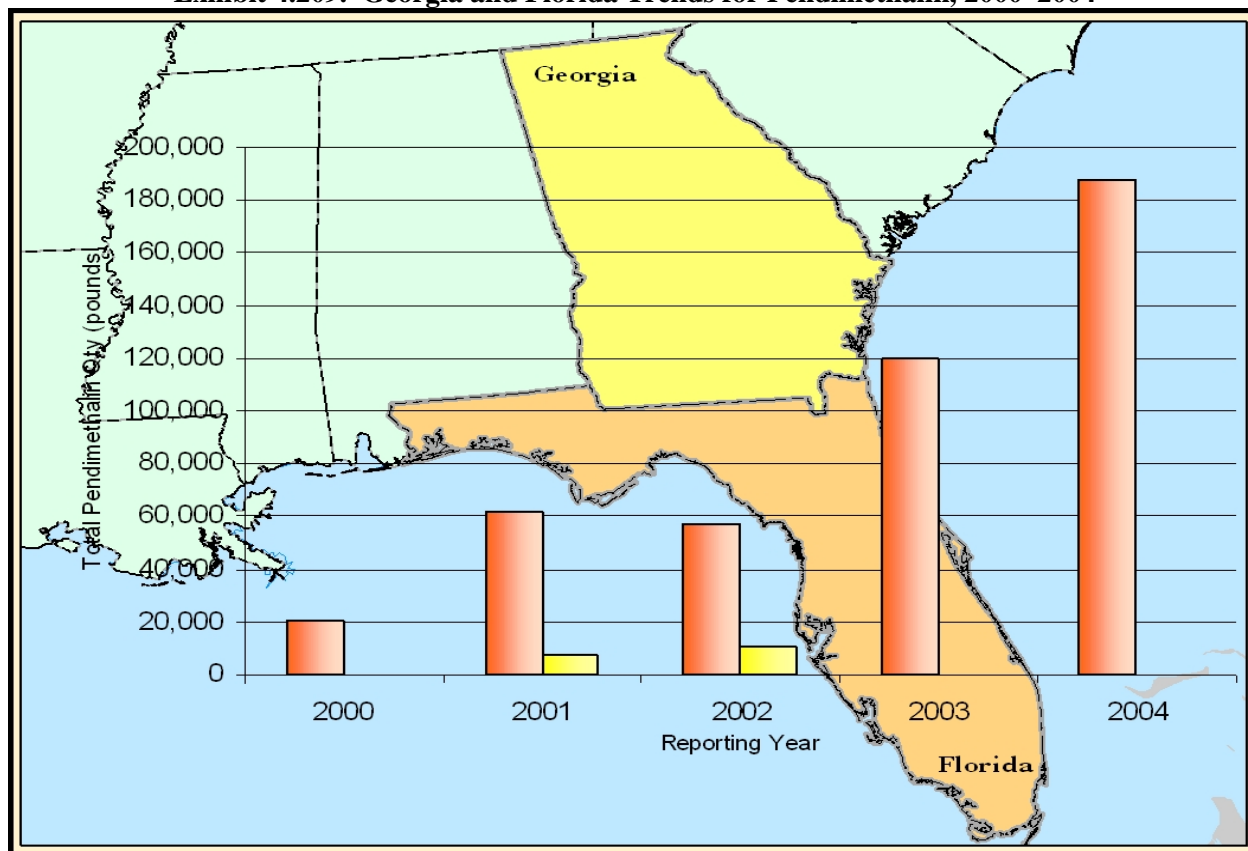
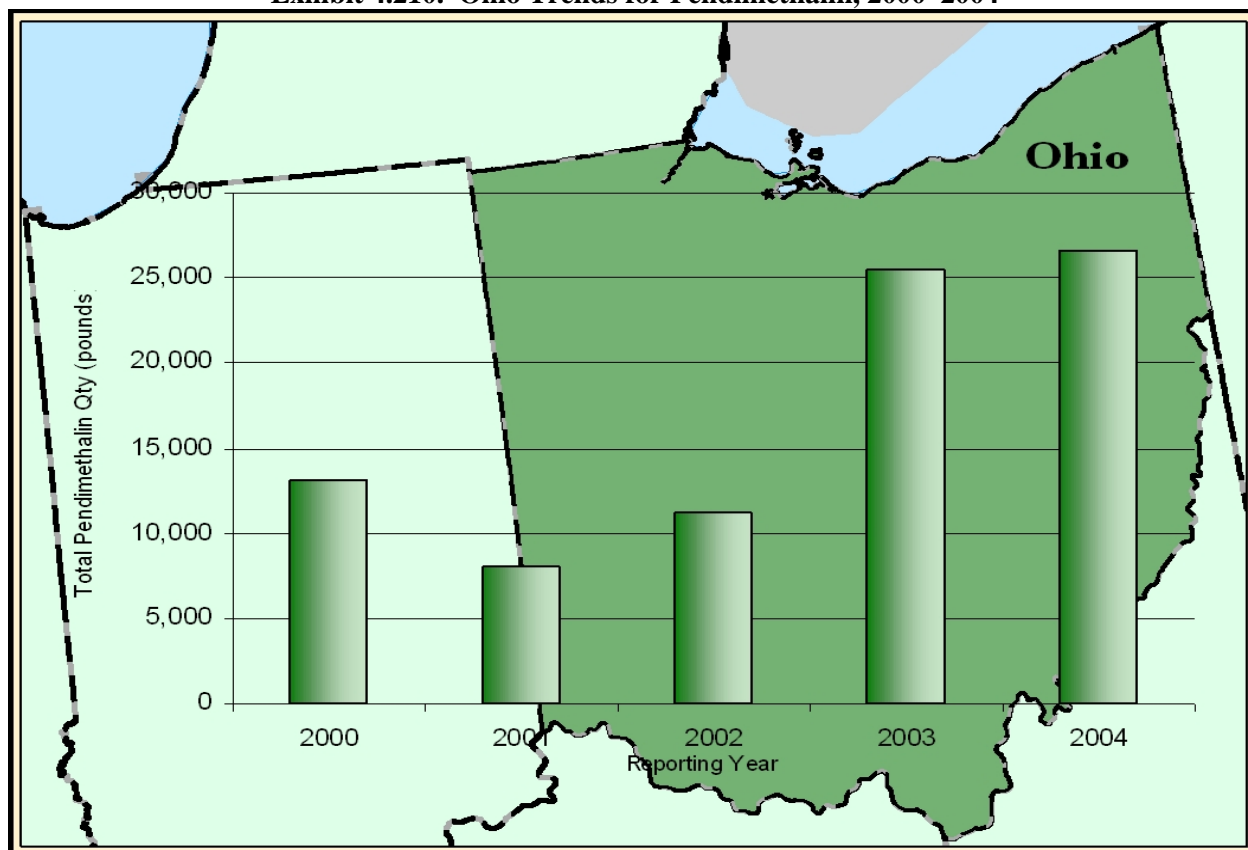


Exhibit 4.210. Ohio Trends for Pendimethalin, 2000–2004

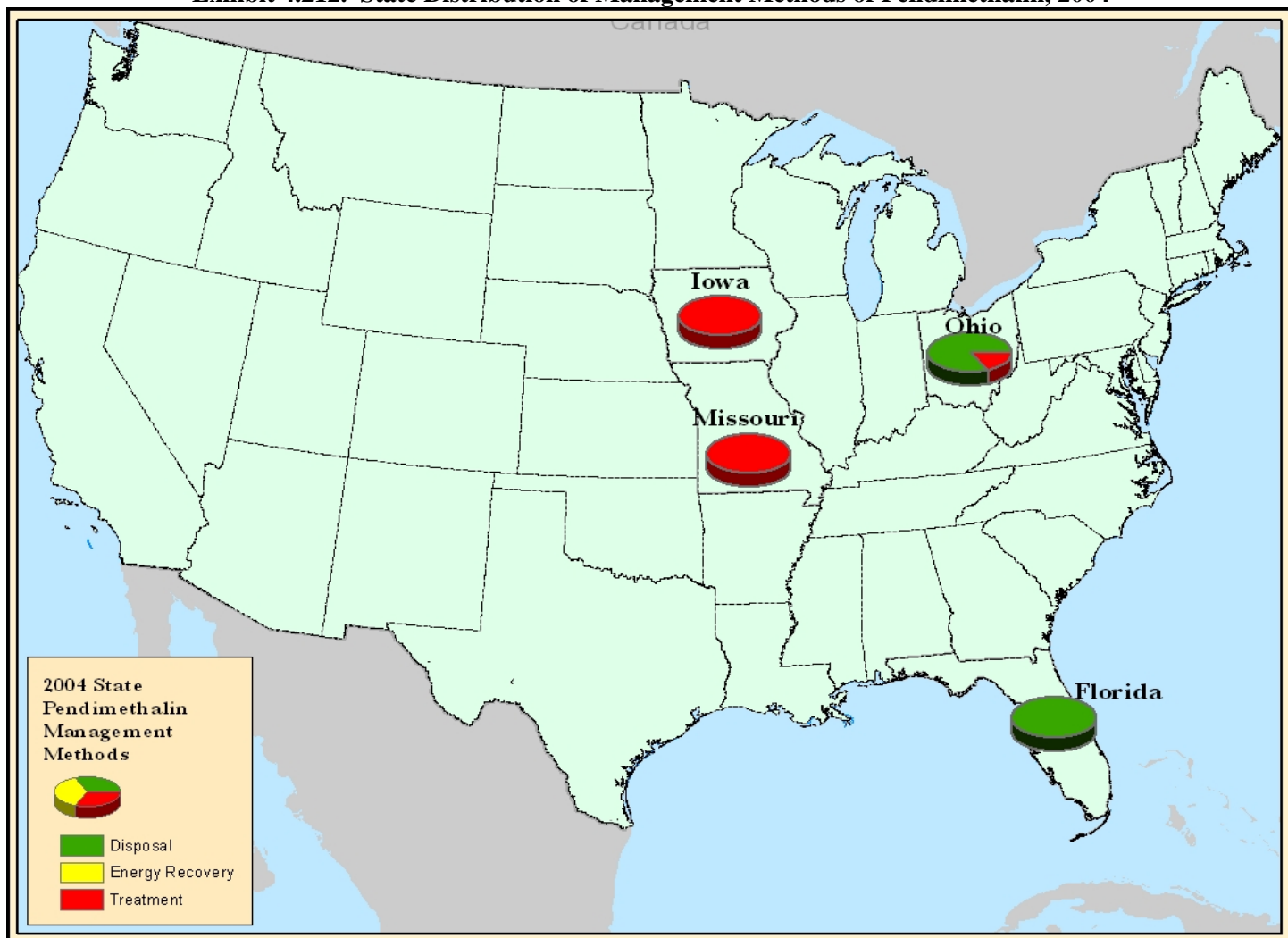


Exhibits 4.211 and 4.212 show how the seven facilities, located in four states, managed pendimethalin in 2004. Facilities in Florida and Ohio primarily land disposed pendimethalin. Facilities in Iowa and Missouri treated virtually 100 percent of the pendimethalin. Less than 3,000 pounds of pendimethalin were recycled in 2004; a facility in Ohio reported most of the recycled quantity.

Exhibit 4.211. State Management Methods for Pendimethalin, 2004

State	Total Quantity of Pendimethalin (2004)	Onsite Disposal (pounds)	Offsite Disposal (pounds)	Onsite Energy Recovery (pounds)	Offsite Energy Recovery (pounds)	Onsite Treatment (pounds)	Offsite Treatment (pounds)	Onsite Recycling (pounds)	Offsite Recycling (pounds)
FL	187,711	158,889	28,822	0	0	0	0	451	0
IA	1,200	0	0	0	0	0	1,200	0	0
MO	260,235	1	0	0	0	250,000	10,234	0	0
OH	26,549	0	22,510	0	0	0	4,039	2,424	0
Total	475,695	158,890	51,332	0	0	250,000	15,473	2,875	0

Exhibit 4.212. State Distribution of Management Methods of Pendimethalin, 2004



Industry Sector (SIC) Trends:

Exhibit 4.213 shows the quantity of pendimethalin reported by facilities in six industry sectors from 2000 to 2004. In 2004, only seven facilities in three industry sectors reported pendimethalin. Compared to the quantities of pendimethalin reported in 2000, facilities in SIC 2879 (Pesticides and agricultural chemicals, nec) reported a decrease of approximately 379,000 pounds. Since 2000, two facilities in Florida have reported used SIC 2061 (Raw cane sugar) or SIC 2062 (Cane sugar refining). As such, the quantities for these two industry sectors are in reality from the same two facilities.

Exhibit 4.213. Industry Sectors Containing Pendimethalin, 2000–2004

Primary SIC	SIC Description	Number of Facilities That Reported Pendimethalin (2004)	2000 (pounds)	2001 (pounds)	2002 (pounds)	2003 (pounds)	2004 (pounds)	Change in Quantity (2000–2004)	Percent of Total Quantity of This PC (2004)
2879	Pesticides and agricultural chemicals, nec	2	640,375	122,342	341,007	284,576	261,435	–378,940	55.0%
2061	Raw cane sugar	2	20,342	0	0	0	158,889	138,547	33.4%
2875	Fertilizers, mixing only	3	13,082	56,650	23,656	43,014	55,371	42,289	11.6%
2062	Cane sugar refining	0	0	20,889	56,499	101,961	0	0	0.0%
2869	Industrial organic chemicals, nec	0	332	185	665	0	0	–332	0.0%
2874	Phosphatic fertilizers	0	0	129	0	0	0	0	0.0%
Total		7	674,131	200,195	421,827	429,551	475,695	–198,436	100.0%

Exhibit 4.214 shows how facilities in these three industry sectors managed pendimethalin in 2004. Onsite treatment was the primary method used by facilities in SIC 2879. The two facilities in SIC 2061 used onsite land disposal. Facilities in SIC 2875 primarily used offsite land disposal. In 2004, two of the SIC 2875 facilities reported some recycling of pendimethalin.

Exhibit 4.214. Industry Sector Management Methods for Pendimethalin, 2004

Primary SIC	SIC Description	Total Quantity of Pendimethalin (2004)	Percent of Total Quantity (2004)	Disposal (pounds)		Energy Recovery (pounds)		Treatment (pounds)		Recycling (pounds)	
				Onsite Disposal	Offsite Disposal	Onsite Energy Recovery	Offsite Energy Recovery	Onsite Treatment	Offsite Treatment	Onsite Recycling	Offsite Recycling
2879	Pesticides and agricultural chemicals, nec	261,435	55.0%	1	0	0	0	250,000	11,434	0	0
2061	Raw cane sugar	158,889	33.4%	158,889	0	0	0	0	0	0	0
2875	Fertilizers, mixing only	55,371	11.6%	0	51,332	0	0	0	4,039	2,875	0
Total		475,695	100.0%	158,890	51,332	0	0	250,000	15,473	2,875	0